COST PROXY MODEL DIAGRAM

DATA SOURCE

ENGINEERING DEPARTMENT AND BENCHMARK COST MODEL
Response to CPM Questionnaire

- % Interoffice Fiber
- % Dig. Loop Carrier on Fiber
- Dig. Loop CXR Invst. by Density Zone
  - a. Fixed Investment
  - b. Variable Investment
  - c. Maximum Capacity
- Fiber and Copper Feeder Makeup
- Serving Area Interface (SAI)
  - a. placement
  - b. Investment by Density Zone
- Terminal & Drop Investment by Density Zone
- Adjustment Factors for Placing Buried Cable, Aerial Cable and Underground Cable
  - a. by density zone & terrain difficulty
  - b. by density zone for water
- Conduit Investments by
  - a. Cable type (Copper/Fiber, Feeder/ Distribution)
  - b. Density Zone
  - c. Terrain Difficulty (Including Water)
- Pole Line Invst. per linear ft.
  - a. Density Zone
  - b. Terrain Difficulty (Including. Water)
- Average Cable Size by Density Zone
- Cable Mix and Utilization by Density Zone
- Cable A and B Unit Investments by
  - a. Average Size
  - b. Type
- Cable fill actual & objective

To Pages 4,5 and 6

A (LOOP)

COST PROXY MODEL DIAGRAM

DATA SOURCE

ADDITIONAL CALCULATIONS

To Pages 4 and 6

CAPITAL COST DATA
- Equity Ratio/Debt Ratio
- Return on Equity
- Return on Debt
- Effective Tax Rate
- Income Taxes
- Tax Depreciation
- Book Depreciation*

* Based on Economic Life from testimony by T.R..Orr/OANAD

Capital Cost Factors
A. Return and Income Tax (RIT)Factor
- by FRC

B. Depreciation Rate
- by FRC

C. Other Operating Tax Factor
(from OANAD Study Vol. 3 Sec. 2)

B (Cap Cost Factors)

OANAD STUDY
A. Nonrecurring Cost Data from NRC Study
- Installation/Disconnect Costs by Product

B. Tariffed Installation Rates
- Residential and Life Line Services

C. Product Location Life
D. Rearrangement/Change Expense

C (Expenses)

Calculate Non-Recurring Cost Burden
Special Cost Calculation
(For Universal Service)

C (Expenses)

Shared/Common Cost Data from OANAD Study, Allocation factors from PI

D (Com. Costs)

COST PROXY MODEL DIAGRAM

DATA SOURCE

To Page 7

OUTPUTS OF SCIS AND OANAD STUDIES
SWITCH AND NETWORK INVESTMENTS
Non Traffic Sensitive Investment by Switch Type*
- by element (i.e.. per feature, trunk term etc..)
- per line (VS)
- per office (NVS)

Traffic Sensitive Investments*
- by product type or group
- by office type (i.e.. end office, tandem)
- by field reporting code (FRC)
- direction (originating or terminating)
- per Minute of Use
- per Busy Hour or Each Hour
- per call attempt

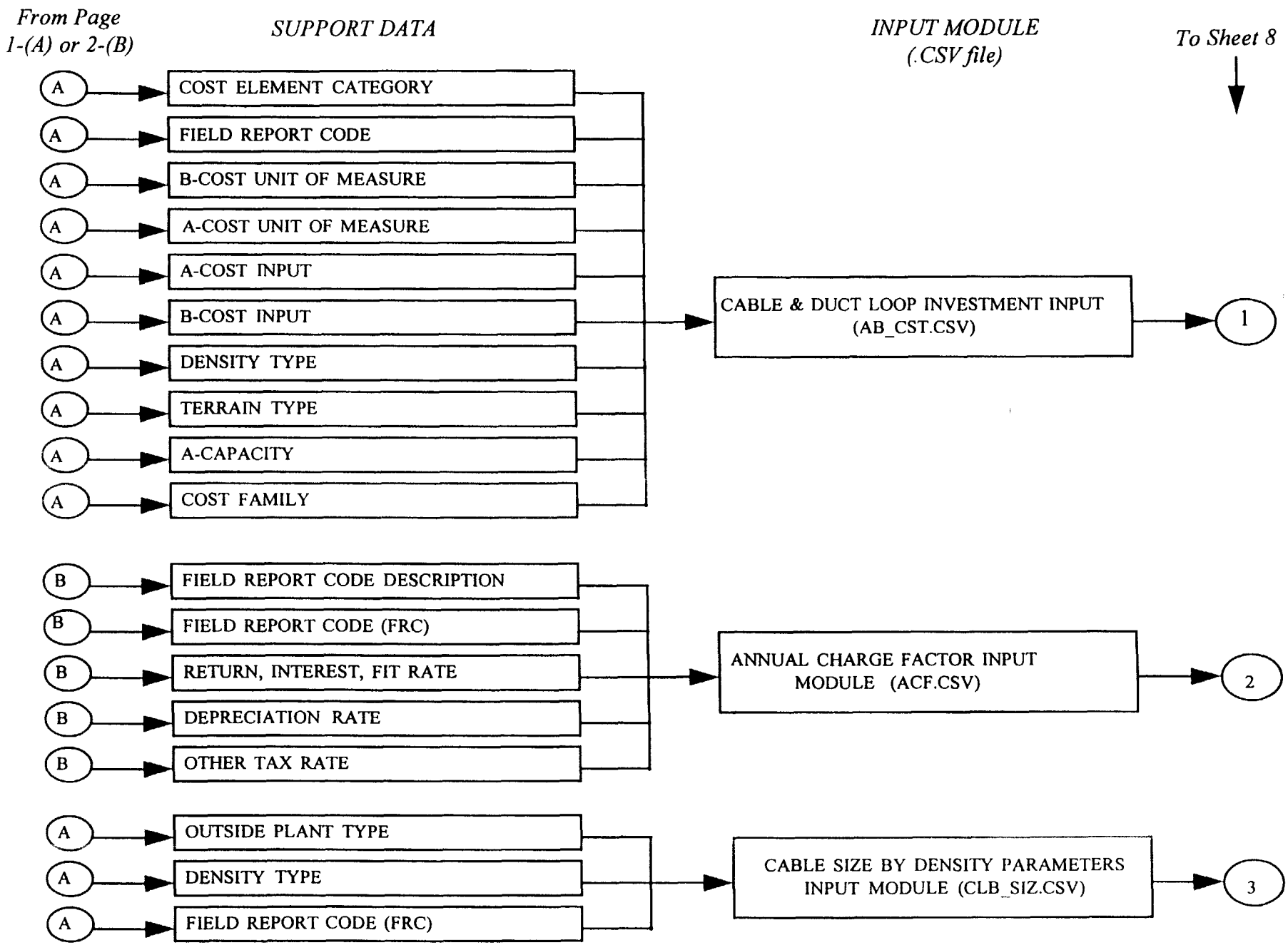
Other Investments*
- MDF & Protector Equipment
- SS7 Octets/Setup

Switch Traffic Usage Data
- by TOD

*Based on 1994 EF&I Investment Data

E
(Switch)

COST PROXY MODEL DIAGRAM



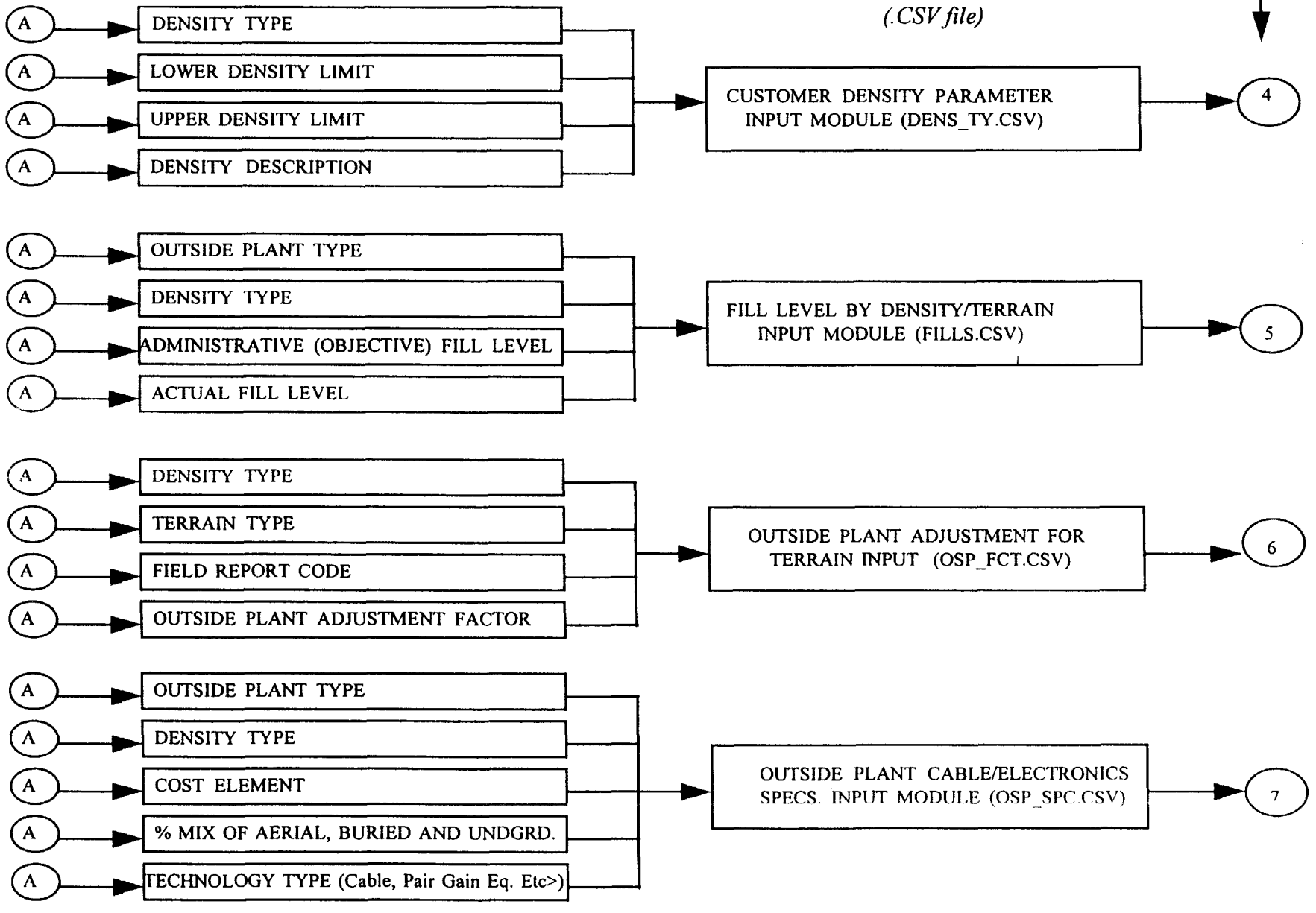
COST PROXY MODEL DIAGRAM

From Page 1

SUPPORT DATA

INPUT MODULE (.CSV file)

To Sheet 8



COST PROXY MODEL DIAGRAM

From Page 1-(A) or 2-(C)

SUPPORT DATA

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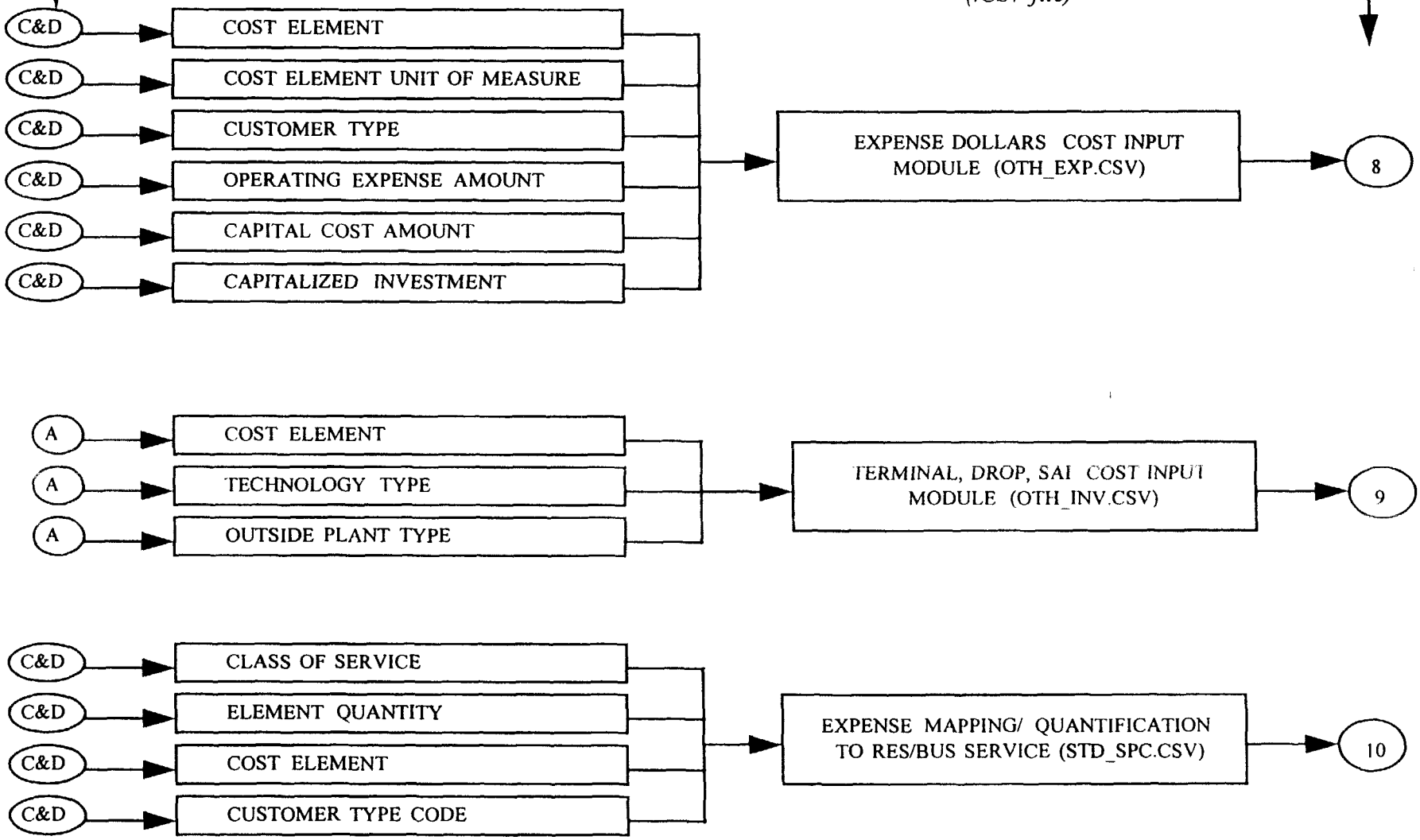
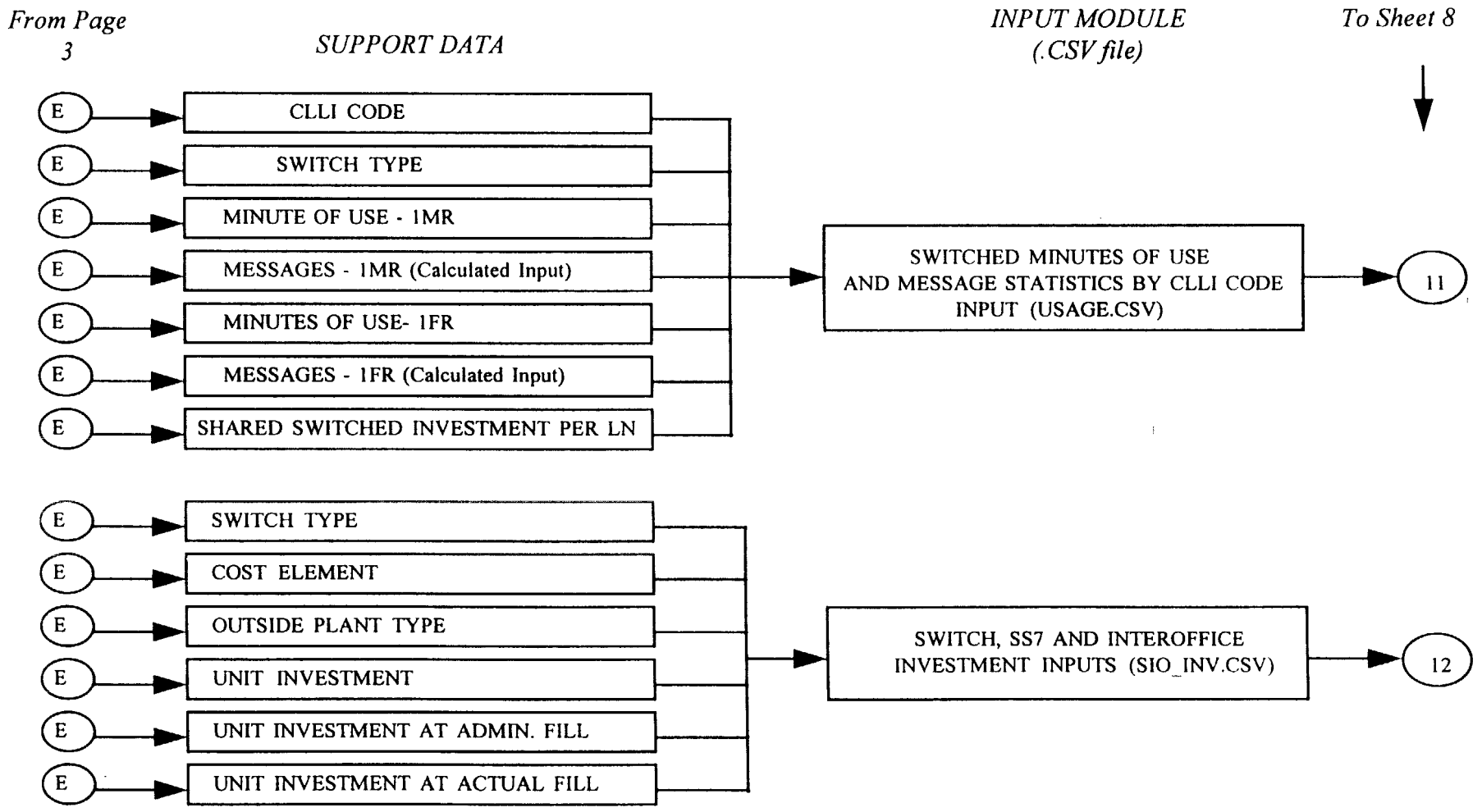
To Sheet 8



COST PROXY MODEL DIAGRAM

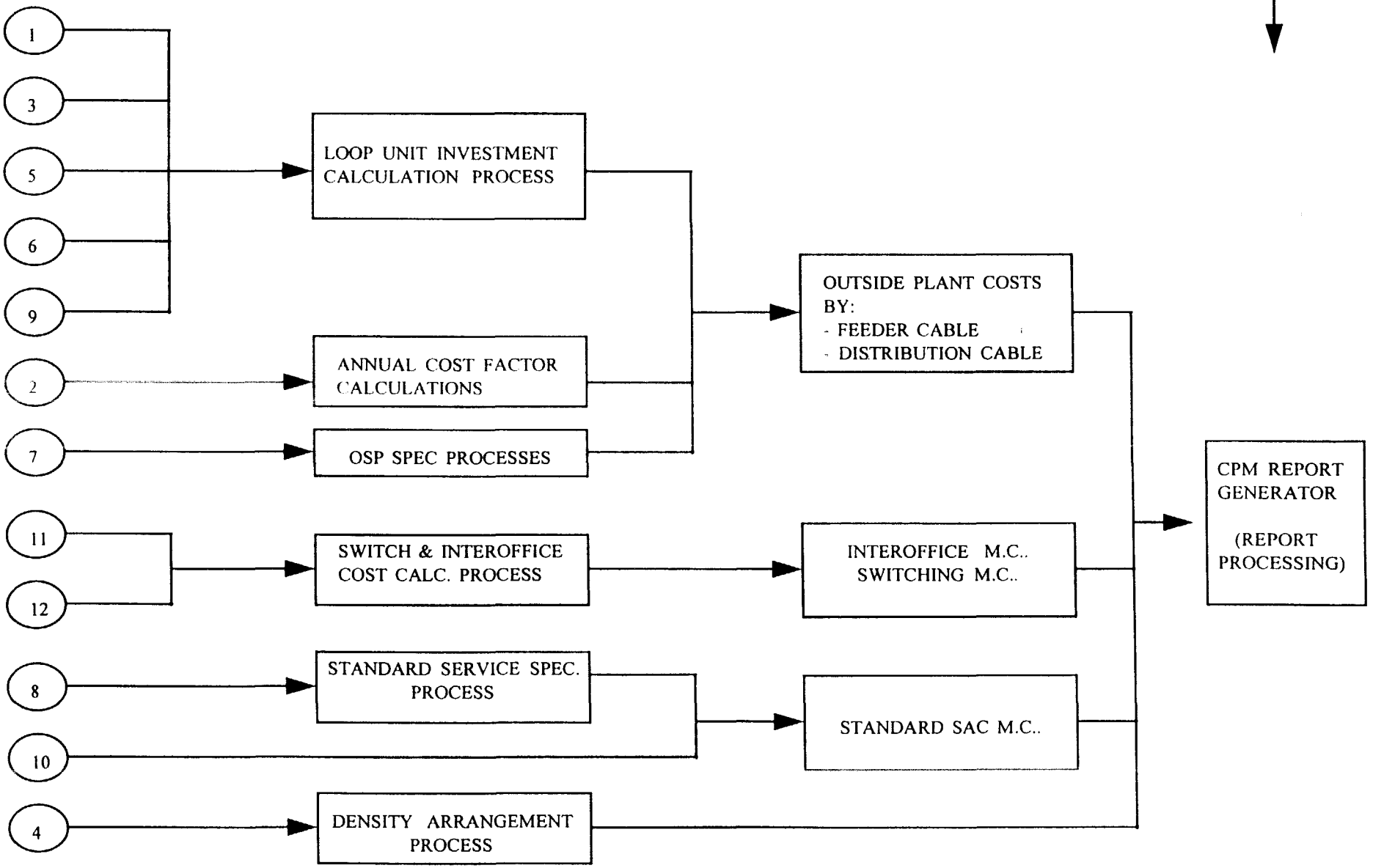


COST PROXY MODEL DIAGRAM

From Pages 4 - 7

CPM INVESTMENT AND COST CALCULATION PROCESS

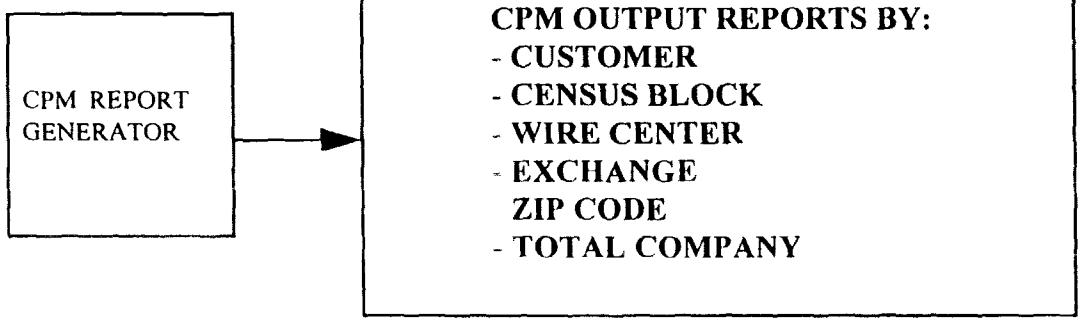
To Page 9



CPM INVESTMENT AND COST CALCULATION PROCESS

From Page - 8

OUTPUT REPORTS



PACIFIC BELL

TESTIMONY OF R. L. SCHOLL

UNIVERSAL SERVICE PROXY COST MODELS

April 17, 1996

BEFORE THE CALIFORNIA PUBLIC UTILITIES COMMISSION

R 95-01-020

I 95-01-021

1. Q. Please state your name and business address.

A. My name is Richard L. Scholl. My business address is 2600 Camino Ramon, San Ramon, California.

2. Q. By whom and in what capacity are you employed?

A. I am employed by Pacific Bell as a Director in the Financial Management Department. I am responsible for the identification of the cost to Pacific of providing its services. I have had this general responsibility since April. 1981. I have been Pacific's primary cost of service expert witness since 1984.

3. Q. Please state your educational background and work experience.

A. In terms of formal education, I have been awarded a Master of Business Administration degree by the University of Santa Clara, and Master of Science and Bachelor of Science in Electrical Engineering degrees by Purdue University. In addition, I have attended various specialized courses and seminars since joining Pacific. These course and seminar topics include economics, finance, marketing, and cost identification. In addition to my current assignment, my work experience with Pacific includes various assignments in operations, engineering, marketing and internal consulting. I also had an inventory management assignment at AT&T prior to divestiture.

4. Q. Have you testified before this Commission in the past?

A. Yes. I have testified before this Commission as Pacific Bell's cost of service witness in Pacific's Local Competition proceeding (I. 95-04-044, Phases I and

II), as Pacific's cost of service and imputation (price floor) witness in the IRD proceeding (I. 87-11-033, Phase III), as Pacific's cost of service witness in Pacific's 1986 general rate case (A. 85-01-034), in Phase III of Pacific's access charge application (A. 83-06-065), in Pacific vs. Wang Communications Inc. (Case No. 86-10-012 and related matters), in the rebuttal phase of Pacific's 1983 general rate case (A. 83-01-022), and in the Customer Owned Pay Telephone hearings ([I & S] Case 85-02-051). I participated in the incremental cost methodology workshops held last summer in the OANAD proceeding which eventually resulted in the "Consensus Costing Principles" for TSLRIC studies adopted by the Commission in D. 95-12-016.

I. Summary

5. Q. What is the purpose of your testimony?

A. The purpose of this testimony is twofold:

- To identify that the cost estimates produced by the universal service cost estimation model presented by AT&T and MCI known as "The Hatfield Proxy Model" (the Hatfield Model) consistently understate the costs of providing universal service in California, and the model is therefore not appropriate, and

- To demonstrate that the costs identified using the Cost Proxy Model developed jointly by Pacific Bell and Dr. Emmerson, reasonably estimate costs of providing universal service.

II. *The Hatfield Proxy Model consistently underestimates Pacific Bell's cash operating expenses required to provide Universal Service.*

A. *The Hatfield Model applies embedded cost factors and incorrectly represents the result as an incremental cost study.*

6. Q. How does the Hatfield Model estimate expenses incurred providing universal service?

A. For many expenses, the Hatfield Model's basic structure is to estimate cash operating expenses by applying factors to incremental investments. Those factors are derived from relationships between embedded investments and expenses. This process is wrong for three reasons:

- First, using this factor approach is inherently flawed in an incremental cost model where the factors are applied against equipment prices. This approach incorrectly assumes that Pacific's operating expenses such as maintenance expenses will drop if an equipment vendor drops its equipment prices, or will rise if an equipment vendor raises its equipment prices. This is nonsense. It requires no fewer technicians

to repair a piece of equipment just because a vendor lowered the price of the equipment. This is precisely the reason that our Cost Proxy Model does not use this flawed approach. Instead, in our model, the user directly inputs all operating expenses. The source of these operating expenses is the TSLRIC study presented in the OANAD proceeding. While the Hatfield Model's factor approach may be useful in an *embedded* cost study where embedded investments (the aggregate of all of the investments on a company's books) are relatively stable over time, it has no place in an *incremental* cost study where equipment prices can be quite volatile.

- The second thing wrong with the approach used in the Hatfield Model is that the factors are derived from relationships between operating expenses and *embedded* investments. These relationships simply have no bearing on the relationship between operating expenses and *incremental* investments. Depending on the relationship between embedded investments and current equipment prices for the newest technology equipment, the Hatfield Model can over or understate operating expenses. Since in the Hatfield Model most incremental investments are assumed to be significantly lower than booked investments, the model systematically understates operating expenses.

- The third thing wrong with the approach used in the Hatfield Model is that it will tend to overstate costs in areas that require higher

investment costs but not necessarily higher operating expenses. For example, loop investments will vary by loop length and density. For low density rural areas, with higher average loop investments, the Hatfield Model will calculate correspondingly high operating expenses. In my experience, I have not found that situation to be true. Pacific's average loop maintenance costs are not higher in rural areas.

B. *The Hatfield Model has incorrectly determined the cost factors it applies to investment for estimating costs of providing Universal Service.*

7. Q. What is wrong with the way the Hatfield Model determines the cost factors that it applies to investment for estimating costs of providing Universal Service?

A. The Hatfield Model not only utilizes its inferior cost factor process, it applies the factors incorrectly in a manner which underestimates costs. For example, the factor used in the Hatfield Model to estimate digital switch maintenance expenses, AT&T / MCI use a factor from a New England Telephone cost study for New Hampshire.[1] The factor is the ratio of digital switch

[1] Elsewhere, the Hatfield Model uses Pacific Bell data for development of other maintenance cost factors. This is an example of the builders of the Hatfield Model selectively choosing their processes to consistently underestimate costs.

maintenance to "adjusted" embedded investment. The Hatfield Model then uses that factor to calculate switch maintenance everywhere, including California.

AT&T / MCI further described that the Hatfield Model determined that switching investment varies by switch size, with the largest investment per line occurring for switches with the smallest line size. As New Hampshire is characterized by small towns with small switches, these switches should have higher switching investments per line than would be the case for a state like California, with most lines in large switches in metropolitan areas.

As there is no evidence that digital switch maintenance costs per line vary significantly by the line size of the switch, by using the switch maintenance factor for New Hampshire's high switch unit investment, the Hatfield Model creates a factor only for "small town" states like New Hampshire, but that factor is clearly much to low for California with its cities. Applying the low switch maintenance factor from New Hampshire to Pacific's lower per-line switch investment will, by necessity, underestimate the switch maintenance costs of Pacific Bell.

FCC ARMIS data bear out that the Hatfield Model's switch maintenance expense factor and reliance on New Hampshire data results in a completely unreliable estimate of switching maintenance expense. The Hatfield Model uses a digital switch maintenance factor of 0.0269 from a 1992 study for New

Hampshire. The 1993 ARMIS data (Figure A) shows that the average RBOC had a Digital Switch Maintenance factor of 0.058, while Pacific's was 0.054. The New Hampshire factor clearly has no relevance for Pacific Bell.

AT&T / MCI claim to have verified the switch maintenance factor by comparing it with data reported by U S West, another company with a significant portion of its customer base in small communities. AT&T / MCI claimed in the workshops that the low switch maintenance factor from New Hampshire was due to efficient operations (as opposed to higher per-line investments), yet the factor from the 1993 ARMIS report for New York Telephone, the sister company of New England Telephone in NYNEX, had a factor of 0.053. If the factors represented relative efficiency, then both New Hampshire's and New York's factors should be equal as NYNEX could be expected to be equally efficient in each of its state operations.

The approach used by our CPM in determining switching maintenance expenses directly from available company data is far superior to the manipulatable factor approach employed by the Hatfield Model. At the very least, if a factor approach is used, any factor used must be computed with California specific data, not data from a totally dissimilar state.

Finally, this problem in the Hatfield Model in the way it estimates switching maintenance is exacerbated by the Hatfield Model's method of estimating incremental switching investment. As I describe below, the Hatfield Model

grossly understates Pacific's switching investment. By applying the inappropriately low switching maintenance expense factor to a significantly understated investment, the Hatfield Model compounds its error and understates switching maintenance costs even more.

FIGURE A

1993 ARMIS Data -- Analysis of Digital Switch Maintenance to Digital Switch Investment

Company	Expense	Investment	Factor
All LECs	2,206,401	39,119,365	0.056
All RBOCs	1,615,720	27,664,686	0.058
All Other LECS	590,681	11,454,679	0.052
Illinois Bell	95,815	1,276,012	0.075
Michigan Bell	72,059	1,008,400	0.071
Bell of PA	82,146	1,193,931	0.069
New Jersey Bell	65,483	1,092,997	0.060
Bell South	346,624	5,310,713	0.065
New England Tel	73,949	1,880,782	0.039
New York Tel	182,597	3,445,909	0.053
Pacific Bell	159,274	2,933,710	0.054
Southwestern Bell	149,817	2,411,316	0.062
US West	121,877	3,270,438	0.037
GTE Calif	96,311	1,627,242	0.059

8. Q. Are there other examples of the Hatfield Model incorrectly determining the cost factors it applies to investment?

A. Yes. The Hatfield Model incorrectly determines the cost for buried cable maintenance. Instead of applying a buried cable maintenance factor to the

buried cable investments developed in the model, the model applies a factor for underground cable maintenance. As the factor for underground cable maintenance (0.031) is significantly lower than the factor for buried cable maintenance (0.068), the Hatfield Model deviates from its own process in order to understate buried cable maintenance by more than half.

C. *The Hatfield Model consistently underestimates the costs of providing Universal Service when compared to costs from our just completed TSLRIC studies.*

9. Q. Have you compared the outputs of the Hatfield Model with your directly determined OANAD cost study results?

A. Yes. The Hatfield Model consistently underestimates cash operating expenses directly associated with providing Universal Service. For example, the Hatfield Model estimates the cost of Directory Assistance (DA) calling at $.01 per call. This is nonsense. One reason that the Hatfield Model is so far off is because it chooses to omit all costs associated with the DA operators. Pacific's OANAD cost study identified that the operator wages alone for one DA message is over $0.18. The total volume sensitive TSLRIC for a single DA message is $0.34. When applied to all of the DA calling made under the five call allowance of basic residential service, the Hatfield Model, by making this simple error, has underestimated our DA costs associated with Universal Service more than $100 Million per year.

In addition, for some reason not explained by AT&T / MCI, while the Hatfield Model identifies "Operator Services, non-charged, incl DA" expenses of $5,735,113, using the process I described, those expenses are excluded from the Hatfield Model's calculation of the total annual subsidy.

10. Q. Do the expenses estimated by the Hatfield Model include all of the expenses which would be incurred by a provider if it undertook to be a carrier of last resort under the Commission's proposed Universal Service rules?

A. No. The Hatfield Model underestimates many expenses and ignores others. In Table 1, I have identified expense comparisons between what the Hatfield Model estimates for Pacific Bell and the expenses in our Cost Proxy Model. The values in our model are the TSLRIC expenses identified in Pacific's OANAD cost study. Further, while I have not been able to verify that I have identified all instances where the Hatfield Model has understated or ignored expenses, I have described several specific instances where the Hatfield understates or omits entire areas of expense.

EXPENSE COMPARISONS

	Expense	Hatfield Model Estimates (per line per month)	CPM (per line per month)	Hatfield Understatement
1	Directory Assistance	(Excluded from subsidy calculation)	$ 0.93 per line per month ($0.33 per call)	$106 Million
2	Switch Maintenance	$0.43	$0.50	$8 Million
3	Loop Maintenance	$0.90	$2.48	$179 Million
4	Directory White Pages	$0.15	$0.31	$18 Million
5	Customer Services	$1.25	$3.39	$243 Million
6	Network Operations	$4.26	$1.91	($267 Million)
7	"Operator Minus"	"Included in DA"	$0.11	$13 Million
8	Non-recurring costs	$0.00	$1.51	$174 Million
9	G & A	$0.91	$1.90	$114 Million
10	Uncollectables	$0.53	Not included	($22 Million)
10	Capital Costs	$6.85	$13.26	$729 Million
	Total	$14.94	$26.33	$1,295 Million

TABLE 1

11. Q. On Table 1, why does your model identify costs for service establishment and removal while the Hatfield Model shows no such costs?

A. This is another example of the Hatfield Model omitting costs incurred for Universal Service. The costs to establish and disconnect basic service are

unarguably costs of providing Universal Service. As such, they should be captured by any proxy cost model. In the IRD decision (D. 94-09-065) the Commission clearly established that below-cost installation charges are an important element of Universal Service. Any Universal Service subsidy calculation must include both the revenues and costs associated with these nonrecurring activities.

12. Q. Why is there such a large difference in the expenses identified for Customer Services (i.e., billing and remittance, collections and billing inquiries) in the two models?

A. In its description of the billing and collections and inquiries, AT&T / MCI identified that the data from the New Hampshire study was $1.06 for billing the customer and processing the customer's returned payments, plus $0.16 for billing inquiries. AT&T / MCI presented the total as $1.25. No attempt was made in the Hatfield Model to include costs of collections. Pacific's identified costs include costs of billing, collections and billing inquiries.

13. Q. Has the Hatfield Model identified costs not included in Pacific's CPM?

A. Yes. Uncollectables are normally treated as a revenue offset. However, the Hatfield Model includes uncollectables using a cost factor that will inappropriately calculate large uncollectables in high cost areas. The correct approach is to determine uncollectables as a percentage of basic service revenues in the subsidy calculation.

D. *The Hatfield Model inappropriately mixes cost inputs from inconsistent and inappropriate sources*

14. Q. Does AT&T / MCI's Hatfield Model use a consistent source of data for its inputs?

A. No. The Hatfield Model inputs are from varied sources that are inconsistent and inappropriate. For example, as previously discussed, the model uses embedded cost factors to estimate incremental costs. It uses Pacific Bell data to develop all its embedded cost factors except for digital switch maintenance, where it uses a factor from a New Hampshire cost study. Furthermore, the New Hampshire derived factor is an embedded factor that is adjusted by an unexplained book-to-current cost ratio. This book-to-current cost factor inappropriately reduces the New Hampshire embedded cost factor.

In the area of customer service costs, the Hatfield Model also uses data from the New Hampshire study. However, the New Hampshire study is not a TSLRIC study. The costs in the New Hampshire study appear to be the marginal costs incurred with a 10% change in volume. The Commission rejected this type of incremental cost approach when it adopted the Consensus Costing Principles (Principle No. 3 requires "The increment being studied shall be the entire quantity of the service provided, not some small increase in demand").

The overhead factor in the Hatfield Model is another example of using inconsistent and inappropriate inputs. AT&T / MCI use a 6% overhead factor. They used a factor derived from data from the airline and automobile industries. They did not even use data from their own firms. If AT&T /MCI wanted to use an overhead factor representative of "competitive" industries, they could have used data from their own firms to determine the factor. At least then, they would have stayed within the same general industry. Data from 1993 FCC ARMIS reports show that the embedded overhead factor for all LECs was 0.134. The factor for the RBOCs was 0.116. The factor for AT&T was 0.177, nearly three times the factor adopted by AT&T / MCI. There is no explanation by AT&T / MCI of why they chose to reduce the factor from the LEC industry average to represent the airline and automobile industries rather than to increase it to reflect the "competitive" experience of AT&T.

E. The Hatfield Model understates depreciation expenses

15. Q. Does the Hatfield Model correctly determine depreciation expenses?

A. No. The Hatfield Model understates depreciation expenses by assuming an eighteen year economic life for all investments. It makes no distinction between the economic life of a building, a central office switch, a computer on an employee's desk, or the vehicles employees use. The Hatfield Model assumes that all assets have the same eighteen year economic life.

AT&T / MCI have indicated that the eighteen year average life represents an average determined from recent FCC decisions. However, an eighteen year service life equates to a depreciation rate of 5.55%. In California, the CPUC composite depreciation rate approved for Pacific is 6.9%, nearly 25% higher than the AT&T / MCI selected rate. Neither the depreciation rate in the Hatfield Model nor that currently approved by the CPUC are appropriate for a TSLRIC proxy model. Those depreciation rates reflect the influences of a regulatory process that historically kept depreciation rates low and extended capital recovery into future years, beyond the economic lives of the equipment. Any proxy cost model intended to sustain universal service in the face of competitive entry must reflect economic lives consistent with fully competitive markets. Those lives should reflect the competitive effects on economic lives caused by PCS, cable television and CLC entry into the market. The current regulatory adopted depreciation lives do not reflect the environment a universal service provider will face. In our CPM model, we used the economic lives from our recent writedown of assets. Compared to the 18 year life assumption in the Hatfield Model, the weighted average economic life for Pacific in the CPM is 12.2 years.